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Tulsa Tornado Tribune

"Where People Who Know The Weather Get Their Weather"

National Weather Service Tulsa, Oklahoma — Winter, 2007

BLIZZARD OF 2006

Record November Snow Blankets Northeast Oklahoma

The storm system which spawned strong to severe thunderstorms across eastern Oklahoma and northwest Arkansas during the afternoon of November 29, 2006, transitioned into a historic winter storm for northeast Oklahoma as November drew to a close. While heavier snow has fallen in the past, none of this magnitude had occurred so early in the season...until now.

A strong early season arctic cold front combined with a powerful upper-level storm system moving in from the west to create a classic set-up for a major winter weather event...one that was well forecast several days in advance despite the often fickle nature of winter storms in the southern United States.

Photo by Alana Sullivan

Owasso, OK front yard after the storm

More about the storm:

We present a detailed account of how the storm came together and how the National Weather Service in Tulsa responded to the event from the days leading up to it, through the conclusion of the historic storm. ❄

NOVEMBER SNOW RECORDS:

The following records were established during the snow storm of November 29-30, 2006.

Tulsa, OK
10.4"...Greatest one day snow for Nov.
previous 4.0" in 1972
10.5"...Greatest monthly snow for Nov.
previous 5.6" in 1972

Bartlesville, OK
15"...Greatest one day snow for Nov.
previous 6.0" in 1923, 1951

Nowata, OK
12"...Greatest one day snow for Nov.
previous 5.0" in 1951

Bristow, OK
9"...Greatest one day snow for Nov.
previous 7.0" in 1932

ICE STORM OF 2007

Thousands Left Without Electricity in Eastern Oklahoma

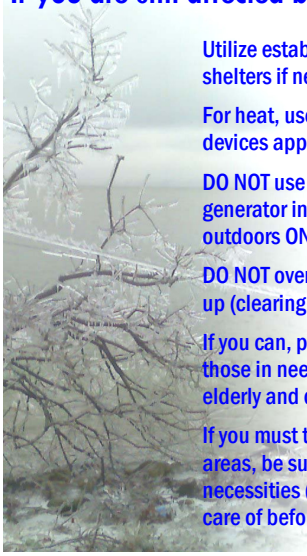
Winter weather made a second dramatic appearance in eastern Oklahoma and far northwest Arkansas as sleet and freezing rain virtually shut down the region over the weekend of January 12-14.

More about the Ice Storm to come in the Spring edition.

The set-up for this winter storm was similar in some ways to the late November storm. However, the cold air dome was much shallower, causing the precipitation to fall as

(ICE STORM Continues on page 6)

If you are still affected by the storm...



Utilize established public shelters if necessary.

For heat, use ONLY burning devices approved for indoor use.

DO NOT use a gas- powered generator indoors...operate outdoors ONLY.

DO NOT over-exert during clean-up (clearing debris, etc.)

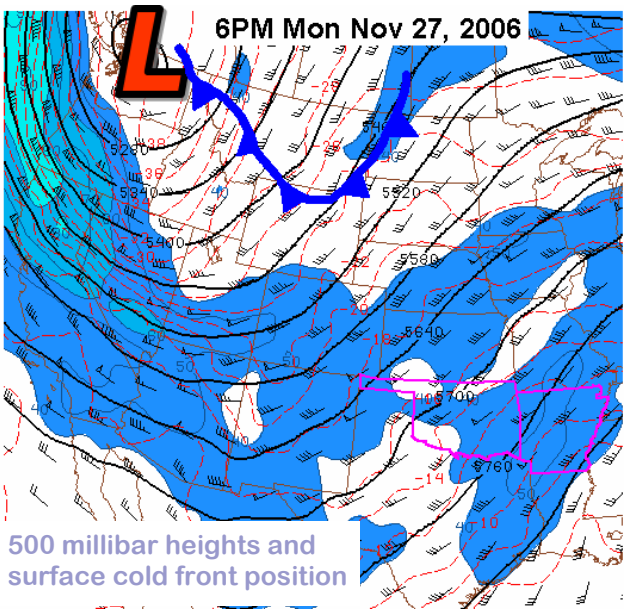
If you can, provide assistance to those in need, especially the elderly and disabled.

If you must travel in the affected areas, be sure to have all travel necessities (gas, etc.) taken care of before you get there.

Sunday November 26: Significant Change Forecast

While the region was enjoying a stretch of unseasonably warm late November weather, computer models were beginning to depict a major shift in the jet stream that would ultimately bring the warm spell to a dramatic end.

Initially, models pointed to an arctic blast to affect the central and southern plains during the middle part of the week of November 26 - December 2, but with little if any precipitation. But, as early as the preceding weekend, a significant change in model trends pointed to not only much colder weather, but a potential winter storm brewing. A strong upper low was now forecast to dive into the southwest U.S. by mid-week along with the arctic air...a very favorable pattern for winter weather!

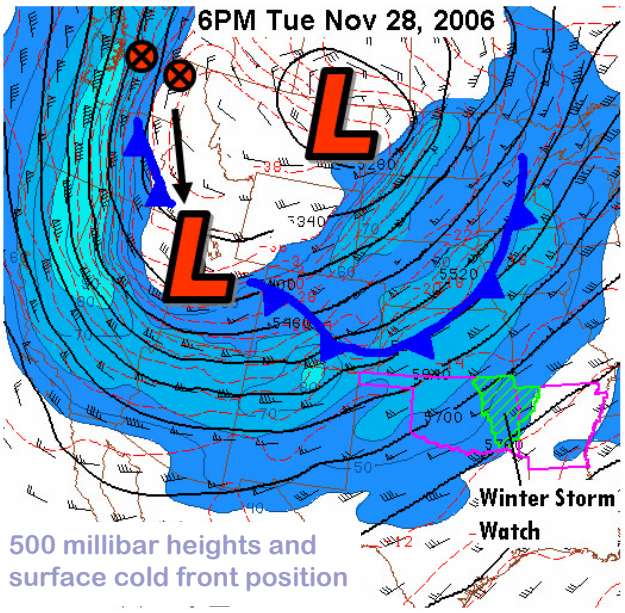


By Sunday the 26th, a Special Weather Statement was issued by the Tulsa office concerning the increasing winter weather potential for Wednesday and Thursday. Cold weather was a virtual guarantee, but the amount or type of precipitation was much less certain.

The upper low was moving into the Pacific Northwest on Monday the 27th (above). Forecasts at this time called for the low to redevelop south as strong jet stream winds dove through the western U.S. on the west side of the low, but timing was still very uncertain.

NWS Tulsa held a conference call with area emergency managers Tuesday morning to discuss the upcoming winter weather potential. By this time, the potential for severe storms ahead of the front looked increasingly likely for Wednesday, with a transition to wintry precipitation by Thursday. ❄

Tuesday November 28: Winter Storm Watch Issued



By Tuesday the 28th, the upper low remained disorganized, but a large piece of energy had moved south into the Great Basin (above), while the arctic front moved into Kansas and Colorado. While computer models continued to show a trend of the low turning east during the next 48 hours, differences in timing and strength of the features were still significant among different models (*almost always* the case with this type of system!). For the most part, they were not depicting accumulating snow in northeast Oklahoma at this time and had a 20 percent chance or less of precipitation for Wednesday night.

Despite the model inconsistencies, a Winter Storm Watch was issued by NWS Tulsa at 4 pm for the entire forecast area, effective Wednesday evening through Thursday night. ❄

WINTER STORM WATCH:

Significant and potentially dangerous winter weather is possible in the 12 to 48 hour timeframe. Heavy snow (4 inches or more) and/or heavy accumulations of ice and sleet are possible.

WEDNESDAY NOVEMBER 29 : WINTER STORM WARNING ISSUED, COLD FRONT ARRIVES

Early Wednesday morning, the arctic front was about to enter northeast Oklahoma, while the upper low continued to move southeast toward the four corners area. The NWS in Tulsa issued a Winter Storm Warning at 4 am Wednesday for the 20 counties (below) where the greatest impact was expected, effective from 6 pm Wednesday until 3 am Friday. The warning was issued for a storm that had yet to fully organize and still needed to make a 90 degree turn to affect the area.

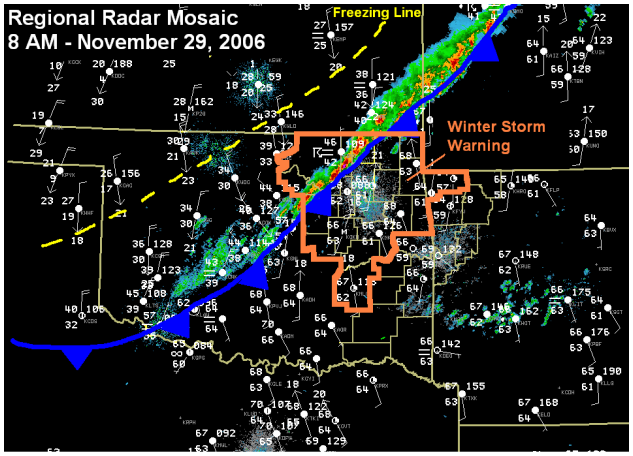
WINTER STORM WARNING

Significant and potentially dangerous winter weather is expected within the next 30 hours.

Four inches or more of snow and/or significant accumulations of ice and sleet are likely.

If freezing rain is expected to be the only precipitation type then an event specific warning called an Ice Storm Warning may be issued.

The front moved into northeast Oklahoma by sunrise Wednesday morning, with a line of showers and thunderstorms developing rapidly along the front (below). Temperatures remained in the 60s south of the front, but quickly fell into the upper 30s as it moved through.



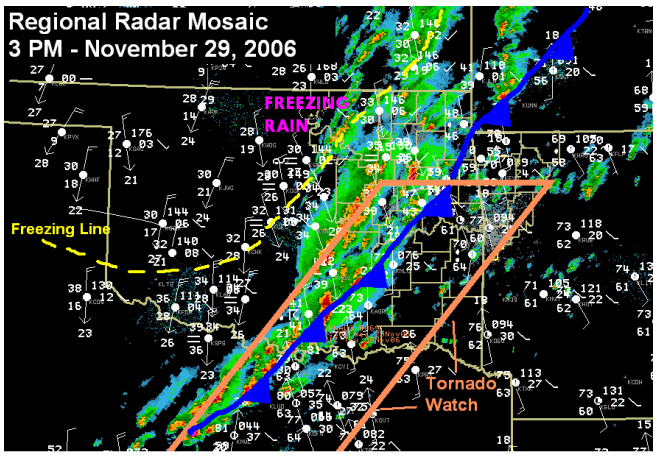
The NWS in Tulsa held a second conference call with area emergency managers Wednesday morning. By 10 am, the front moved just south of Interstate 44, while the upper-level system remained near the four corners area. Temperatures continued to plummet north of the front, with freezing rain and thunder reported at Ponca City.

Meanwhile, south of the front, temperatures had already warmed into the 70s, with dew points in the 60s creating spring-like instability. The Storm Prediction Center issued a Tornado Watch for portions of the area from noon to 7 pm Wednesday (right).

As the front pushed south through mid-afternoon, warm and moist air from the Gulf of Mexico continued to be lifted over the boundary. Numerous showers and thunderstorms continued along and north of the front, but remained below severe limits. By this time, freezing temperatures were occurring in Osage and Pawnee counties.

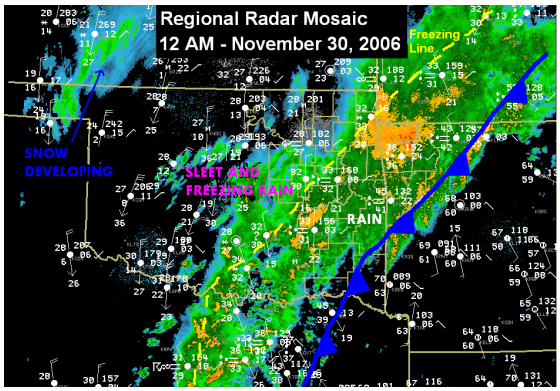
The Winter Storm Warning was expanded at 4 pm to include all counties in the NWS Tulsa forecast area. By this time, the potential for significant icing was becoming high in much of the area. By mid-evening, a mix of sleet and freezing rain fell along and north of I-44, with many locations reporting up to an inch of sleet accumulation.

As the front pushed into southeast Oklahoma and northwest Arkansas during the late evening, a broad area of moderate to heavy rain continued. Most areas south of I-44 received from 2 to 4 inches of rain, with local amounts near 6 inches in southeast Oklahoma. Moderate rises occurred on streams and rivers in the lower Arkansas and upper White River basins. ❄

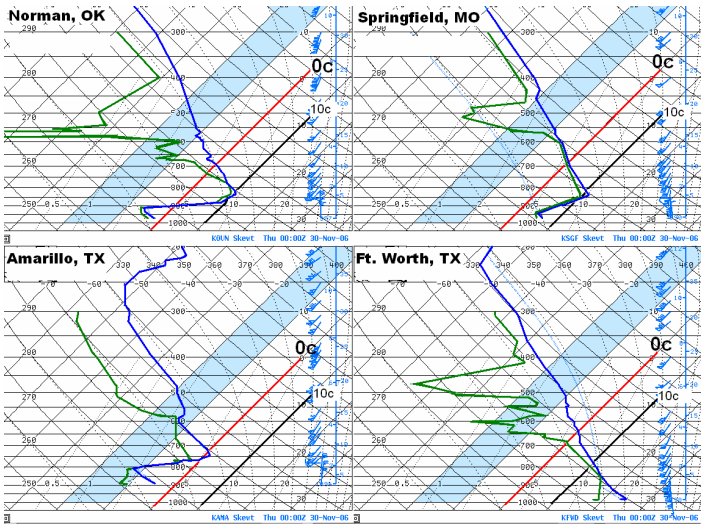


Wednesday Night November 29/30: Trouble Begins

Freezing rain and sleet continued across the northwest half of the NWS Tulsa forecast area during the night, with significant accumulations reported. By midnight, precipitation tapered off in parts of northeast Oklahoma, but continued across the south and east, while cold air continued to plunge south.



The upper low had begun to move east by this time, so the potential for heavy snow later in the day looked more promising all the time. An area of snow began to develop across extreme northwest Oklahoma in response to the low (above), and this snow was forecast to spread east through the day. Model forecasts at this time indicated up to a foot of snow was possible in far northeast Oklahoma by early Friday morning.



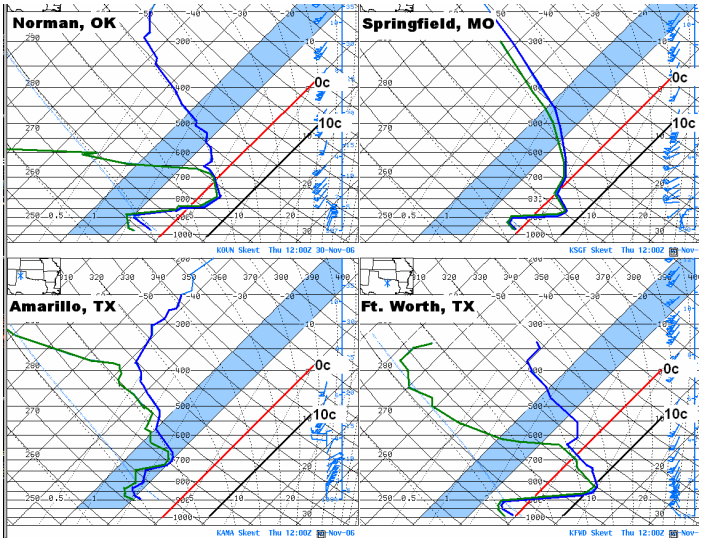
Upper Air Soundings: Wednesday, November 29 - 6 PM

0 degree Celsius isotherm in red.
Blue shaded area represents most likely area of snow growth.

Upper air soundings taken at 6 pm Wednesday evening (above) revealed the contrast in air masses across the region. The Fort Worth sounding showed a very warm and unstable atmosphere south of the cold front, with a surface temperature in the lower 70s. Strong thunderstorms were occurring south of the front at this time.

Both Norman and Springfield were north of the front by this time, but as the soundings revealed, the cold air was very shallow at this point. The Norman sounding showed a very strong warm layer aloft with a temperature of 10 degrees C (50 F) just above the surface, where temperatures had already fallen below freezing. Any precipitation falling in this regime was likely freezing rain.

The Amarillo sounding by contrast, was below freezing through virtually the entire atmosphere, suggesting colder air aloft was moving in from the west as the upper low moved closer.



Upper Air Soundings: Thursday, November 30 - 6 AM

0 degree Celsius isotherm in red.
Blue shaded area represents most likely area of snow growth.

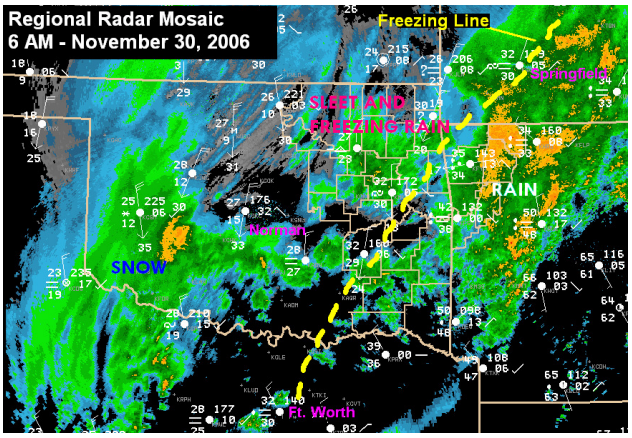
Soundings taken around the area at 6 am Thursday (above) still revealed a strong warm layer above the cold surface air, with temperatures of 10 C (50 F) near 6000 feet AGL at Fort Worth, with a surface temperature of 32 F. This sounding indicated a change to freezing rain was imminent.

By comparison, the Norman sounding had a less pronounced warm layer with a maximum temperature of about 3 C (~38 F), plus a deep layer of sub-freezing temperatures below the warm air. This temperature profile appeared more supportive of sleet.

The Amarillo sounding, near the upper low center, showed below freezing temperatures throughout at this time, indicating colder temperatures aloft were just “upstream”, and would soon change any precipitation falling to snow. ❄

Thursday November 30: Blizzard on the Way?

As the upper low moved into the Texas panhandle Thursday, colder air aloft spread into western Oklahoma, with snow increasing in coverage (below). In addition, a surface low deepened near the Red River in response to the upper system, with winds already gusting to 30 mph in parts of northeast Oklahoma by sunrise.

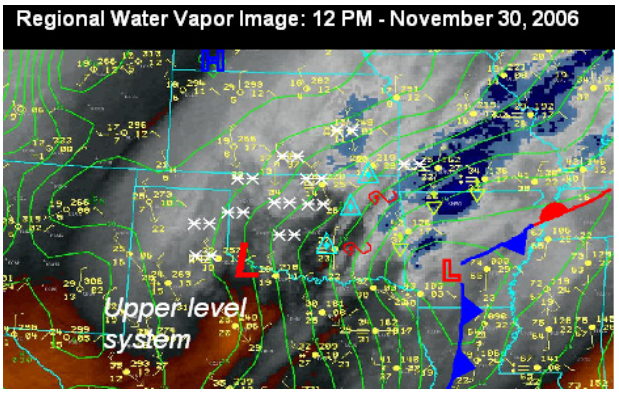


By mid-morning, snow began in Osage and Pawnee counties, and freezing rain spread into far northwest Arkansas. The surface low to the south continued to deepen, and by noon (above right), winds were gusting to almost 40 mph in northeast Oklahoma. The winds and snow prompted the NWS Tulsa to issue a Blizzard Warning at midday, the first ever issued by the Tulsa office!

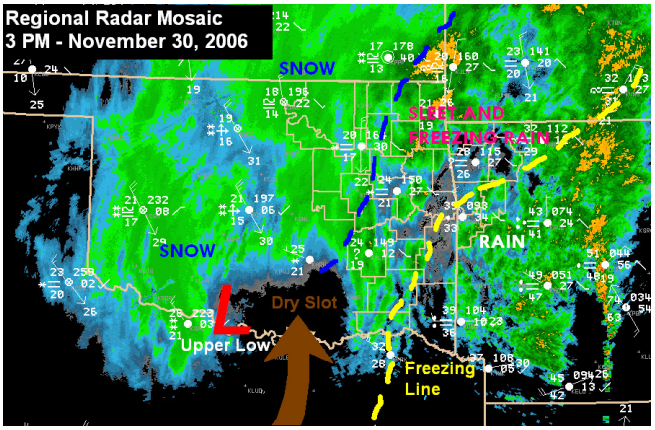
BLIZZARD WARNING:

The combination of heavy snow and strong wind of more than 35 mph will result in visibilities of less than 1/4 mile for more than 3 hours.

The upper low moved east along the Red River with moderate to heavy snow spreading into northeast Oklahoma through the afternoon. Only the lower Arkansas river valley and a few areas of extreme southeast Oklahoma still reported rain through mid-afternoon.



An area of minimal radar returns showed up across south central Oklahoma in the afternoon (below), indicating a "dry slot" was located just east of the upper low center. The dry slot pushed east, limiting additional precipitation across west central Arkansas and far southeast Oklahoma. These areas saw only a brief period of freezing rain late Thursday afternoon. The Winter Storm Warning was dropped south of a McAlester to Fort Smith line at 9 pm.

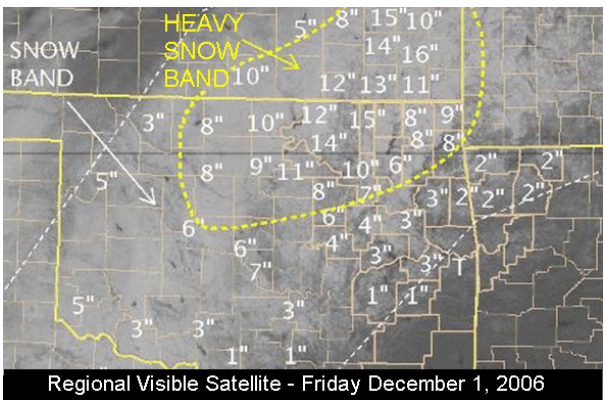


The low lifted northeast Thursday evening with a band of moderate to heavy snow to the north and northwest of the low center. All turnpikes near Tulsa were closed Thursday night due to drifting snow and near zero visibility. ❄

Friday December 1: The Final Tally

Snow ended before sunrise Friday morning, but left many residents of northeast Oklahoma digging out of several inches of snow. Several thousand people were without power at the height of the storm, and some area schools were closed up to five days.

As skies cleared the next day, visible satellite imagery (right) revealed the extent of the snow cover across the area. The snow cover lingered for several days before temperatures warmed back to well above average readings by mid-December. ⁂



Spring 2007 SKYWARN Training

The following SKYWARN training sessions have been scheduled by the NWS Tulsa, as of January 17, 2007. Be sure to check the calendar posted on our website for any changes to the schedule listed below.

County	Date	Time	Town - Location
Benton	Feb. 22	7:00 PM	Rogers - TBA
	Feb. 27	TBA	Siloam Springs - TBA
Cherokee	Feb. 26	7:00 PM	Tahlequah - Armory Municipal Center
Crawford	Mar. 6	7:00 PM	Van Buren - Kibler Road Church of God
Franklin	Jan. 25	7:00 PM	Charleston - Community Center
Haskell	Feb. 15	7:00 PM	Stigler - Vocational Training Center
Latimer	Mar. 13	7:00 PM	Wilburton - Fire Training Center
LeFlore	Feb. 20	7:00 PM	Poteau - Kiamichi Vo-Tech
Mayes	Feb. 13	7:00 PM	Locust Grove - Upper Elementary School
McIntosh	Feb.1	7:00 PM	Checotah - Senior Citizens Center
Muskogee	Feb. 8	7:00 PM	Muskogee - Roxy Theatre
Nowata	Jan. 22	7:00 PM	Nowata - Fire Department
Okfuskee	Jan. 29	7:00 PM	Okemah - Brick Street Cafe
Okmulgee	Jan. 31	2:00 PM	Okmulgee- OSU-Okmulgee Student Union
	Feb. 6	7:00 PM	Okmulgee- OSU-Okmulgee Student Union
Osage	Mar. 8	7:00 PM	Pawhuska - Fairgrounds Woman's Bldg.
Ottawa	Mar. 5	7:00 PM	Miami - Community Center
Pittsburg	POSTPONED DUE TO ICE		
Pushmataha	Feb. 19	6:00 PM	Antlers - Library Community Room
Rogers	Mar. 14	7:00 PM	Claremore - OSU County Building
Sebastian	Feb. 17	12:30 PM	Ft. Smith - Sutton Elementary School
Sequoyah	Mar. 1	7:00 PM	Sallisaw - Civic Center
Tulsa	Jan. 25	6:30 PM	Sand Springs - City Hall Council Chambers
	Feb. 10	TBA	Tulsa - TTC Lemley
	Mar. 5	7:00 PM	Broken Arrow - Community Center
Wagoner	Mar. 12	7:00 PM	Wagoner - Civic Center
Washington, AR	Jan. 30	7:00 PM	Fayetteville - U of A Engineering Building
Washington, OK	Feb. 24	9:00 AM	Bartlesville - Vo-Tech

Warmest Year Ever?

Preliminary reports indicate that 2006 was, in fact, the warmest year on record for the contiguous United States, just edging out 1998 for the honor. Locally, both Tulsa and Ft. Smith fell short thanks to some not-so-much above normal temperatures in the fall, ranking as the fifth and fourth warmest years, respectively.

Drought Over?

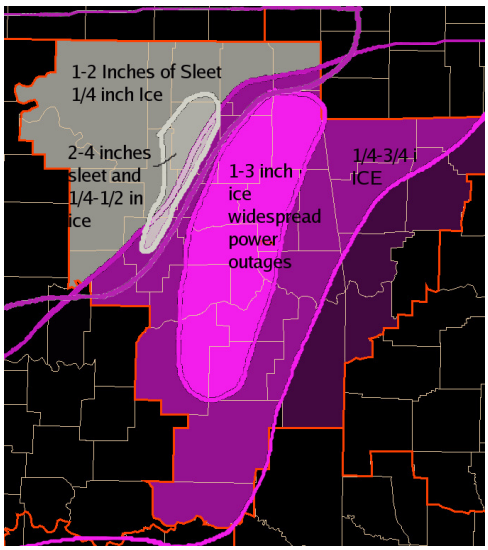
Actually, not quite...but much of the area has seen significant relief in the short term at least. As of January 9, 2007, the area considered to be in a drought were confined to I-44 northward, while formerly drought-ridden southeast Oklahoma and western Arkansas have been removed from the abnormally dry category.

Ice Storm

(Continued from page 1)

freezing rain or sleet instead of snow. Three separate upper-air systems spread subtropical moisture above the shallow arctic airmass, which plunged into the region on January 12.

The hardest hit area was roughly 30 miles either side of a line from McAlester to Muskogee to Grove in eastern Oklahoma, where up to 3 inches of ice on trees and power lines led to widespread power outages, with over 100,000 customers without electricity by January 15. Most of the areas farther north saw from 1 to 3 inches of sleet, which caused major travel problems, but spared the area the brunt of damage.



Map showing the areas of Impact from the January 12-14 ice storm

Heavy rains fell across west central Arkansas and far southeast Oklahoma, causing flooding to occur along both the Illinois and Poteau Rivers. Three to five inches of rain fell in a swath from Choctaw to Sequoyah Counties in eastern Oklahoma and across Sebastian and Franklin Counties in Arkansas.

All 77 counties in Oklahoma were declared a disaster area by the President on January 14. The effects of the storm are expected to linger for weeks.